AMENDMENTS TO THE CLAIMS

Please amend the claims as follows:

1. (Currently amended) A method of end-to-end clock recovery for media streaming, comprising:

receiving a data packet at a media access controller (MAC) of a network adapter, the data packet being a part of a streaming media application;

inspecting [[a]] the data packet ~~sent by an application~~ using a packet match filter to determine a protocol type of the data packet and a location of a timestamp field in the data packet containing an original timestamp; and

if the data packet matches a pre-determined protocol type:

generating a new transmit timestamp for the data packet in real-time, the new transmit timestamp being generated at the time of transmission of the data packet by the packet match filter triggering a snapshot register to take a snapshot of a transmitter timestamp counter;

switching a connection of a physical layer (PHY) from the MAC to the snapshot register using a data switch and inserting the new transmit timestamp from the snapshot register into the timestamp field of the data packet in place of [[an]] the original timestamp for the data packet; [[and]]

switching the connection of the PHY back to the MAC to enable a remaining portion of the data packet; and

transmitting the data packet over a network to a receiver.

2. (Currently amended) The method of claim 1, wherein the receiver, upon receiving the data packet, inspects the received data packet to determine whether the received data packet matches an identification criterion, wherein if the received data packet matches the identification criterion, the method further comprises:

generating a local timestamp by taking a sample of a local clock within the receiver at a time instance of receiving the data packet, wherein the [[the]] time instance is associated with an arrival time of the received data packet; and

processing the local timestamp and the new transmit timestamp in the received data packet to determine an error signal, wherein the error signal is used to adjust the local clock within the receiver.

3. (Original) The method of claim 2, wherein the identification criterion comprises at least one of the pre-determined protocol type, a MAC address, a data type, a source address, and a destination address.

4. (Currently amended) The method of claim 2, wherein the local timestamp is sent along with the received data packet to a receiver application prior to processing the local timestamp and the new transmit timestamp.

5. (Previously presented) The method of claim 2, wherein if the received data packet does not match the identification criterion, then forwarding the received data packet to an application without further processing.

6. (Original) The method of claim 1, wherein the pre-determined protocol type comprises a Real-Time Protocol.

7. (Original) The method of claim 1, wherein the network comprises a data packet-based network.

8. (Original) The method of claim 1, wherein the network comprises one of a wired and wireless network.

9. (Currently amended) The method of claim 1, wherein inspecting the data packet to determine a protocol type of the data packet and a location of the timestamp field in the data packet further comprises the packet match filter comparing a match string with corresponding bits in the data packet based on a mask string, wherein the match string represents a string of bits that match the predetermined protocol type and the mask string indicates the bits in the match string that are to be compared with the corresponding bits of the data packet.

10. (Currently amended) A method of clock recovery for media streaming comprising:

receiving a data packet from a transmitter over a network at a physical layer (PHY) of a network adapter, the PHY being coupled with a media access controller (MAC);

searching the received data packet using a packet match filter to determine if the received data packet matches a pre-determined identification criterion and to locate a timestamp field containing a transmit timestamp within the received data packet as the received data packet is sent to a media device; and

if the received data packet matches the pre-determined identification criterion, then:

generating a local timestamp in real-time indicative of the time instance in which the received data packet arrived by the packet match filter triggering a snapshot register to take a snapshot of a receiver timestamp counter;

sending the received data packet from the PHY to the MAC;

appending the local timestamp from the snapshot register to the received data packet ~~to be sent to the media device~~ utilizing the MAC; and

determining an error signal for adjusting a frequency of a local clock using the local timestamp and [[a]] the transmit timestamp extracted from the received data packet, the transmit timestamp extracted from the received data packet being a timestamp generated at the time of transmission of the data packet that was substituted for an original data packet timestamp.

11. (Currently amended) The method of claim 10, wherein the transmit timestamp extracted from the received data packet is an updated timestamp, the updated timestamp indicating a time when the data packet was transmitted.

12. (Original) The method of claim 10, wherein identification criterion comprises at least one of a protocol type, a MAC address, a data type, a source address, and a destination address.

13. (Previously presented) The method of claim 10, wherein the media device comprises a digital device capable of processing digital media content.

14. (Previously presented) The method of claim 10, wherein the media device comprises at least one of a personal computer, a workstation, a laptop, and a personal digital assistant.

15. (Currently amended) The method of claim 10, wherein searching the received data packet to determine if the received data packet matches a pre-determined identification criterion and to locate a timestamp field within the received data packet further comprises the packet match filter comparing a match string with corresponding bits in the received data packet based on a mask string, wherein the match string represents a string of bytes that match the predetermined identification criterion and the mask string indicates the bits in the match string that are to be compared with the corresponding bits of the received data packet.

16. (Previously presented) The method of claim 10, further comprising:

if the received data packet is a mismatch to the pre-determined identification criterion, forwarding the received data packet to the media device without further processing within the receiver.

17. (Original) The method of claim 10, wherein the pre-determined identification criterion comprises a pre-determined protocol type for a Real-Time Protocol.

18. (Currently amended) The method of claim 10, wherein determining an error signal for adjusting a frequency of a local clock using the local timestamp and a transmit timestamp extracted from the received data packet further comprises:

processing the local timestamp and the transmit timestamp extracted from the received data packet;

determining an error signal between the processed local timestamp and the processed transmit timestamp extracted from the received data packet; and

using the error signal as a feedback signal to adjust the frequency of the local clock in the receiver to synchronize the local clock with a clock in the transmitter.

19. (Currently amended) The method of claim 18, wherein processing the local timestamp and the transmit timestamp extracted from the received data packet comprises one or more of low-pass filtering, jitter filtering, and timing correction techniques.

20. (Currently amended) An article comprising:

a computer-readable medium having a plurality of computer-readable instructions, wherein when the instructions are executed by a processor, the instructions providing for:

receiving a data packet at a media access controller (MAC) of a network adapter, the data packet being a part of a streaming media application;

inspecting a data packet ~~sent by an application~~ using a packet match filter to determine a protocol type of the data packet and a location of a timestamp field in the data packet containing an original timestamp; and

if the data packet matches a pre-determined protocol type, then:

generating a new transmit timestamp for the data packet in real-time, the new transmit timestamp defining the time of transmission of the data packet by the packet match filter triggering a snapshot register to take a snapshot of a transmitter timestamp counter;

switching a connection of a physical layer (PHY) from the MAC to the snapshot register using a data switch and inserting the new transmit

timestamp from the snapshot register into the timestamp field of the data packet in place of an original timestamp for the data packet; [[and]]

switching the connection of the PHY back to the MAC to enable a remaining portion of the data packet; and

transmitting the data packet over a network to a receiver.

21. (Currently amended) The article of claim 20, wherein the receiver, upon receiving the packet, inspects the received data packet to determine whether the received data packet matches an identification criterion, wherein if the received data packet matches the identification criterion, the article further comprises computer-readable instructions for:

taking a sample of a local clock within the receiver at a time instance of receiving the data packet, wherein the sample of the local clock represents a local timestamp and wherein the time instance is associated with an arrival time of the received data packet; and

processing the local timestamp and the new transmit timestamp in the received data packet to determine an error signal, wherein the error signal is used to adjust the local clock within the receiver.

22. (Original) The article of claim 21, wherein the identification criterion comprises at least one of the pre-determined protocol type, a MAC address, a data type, a source address, and a destination address.

23. (Currently amended) The article of claim 21, wherein the local timestamp is sent along with the received data packet to a receiver application prior to processing the local timestamp and the new transmit timestamp.

24. (Previously presented) The article of claim 21, wherein if the received data packet is a mismatch with the identification criterion, forwarding the mismatched received data packet to an application without further processing.

25. (Original) The article of claim 20, wherein the pre-determined protocol type comprises a Real-Time Protocol.

26. (Original) The article of claim 20, wherein the network comprises a packet-based network.

27. (Original) The article of claim 20, wherein the network comprises one of a wired and wireless network.

28. (Currently amended) The article of claim 20, wherein instructions for inspecting the data packet to determine a protocol type of the data packet and a location of the timestamp field in the data packet further comprises instructions for the packet match filter comparing a match string with corresponding bits in the data packet based on a mask string, wherein the match string represents a string of bytes that match the predetermined protocol type and the mask string indicates the bits in the match string that are to be compared with the corresponding bits of the data packet.

29. (Currently amended) An article comprising a computer-readable medium having a plurality of computer-readable instructions, wherein when the instructions are executed by a processor, the instructions providing for:

receiving a data packet from a transmitter over a network at a physical layer (PHY) of a network adapter, the PHY being coupled with a media access controller (MAC);

searching the received data packet using a packet match filter to determine if the received data packet matches a pre-determined identification criterion and to locate a timestamp field containing a transmit timestamp within the received data packet as the received data packet is sent to a media device;

if the received data packet matches the pre-determined identification criterion:

generating a local timestamp in real-time indicative of the time instance in which the received data packet arrived by the packet match filter triggering a snapshot register to take a snapshot of a receiver timestamp counter;

sending the received data packet from the PHY to the MAC;

appending the local timestamp from the snapshot register to the received data packet ~~to be sent to the media device~~ utilizing the MAC; and

determining an error signal for adjusting a frequency of a local clock using the local timestamp and [[a]] the transmit timestamp extracted from the received data packet, the transmit timestamp extracted from the received data packet being a timestamp generated at the time of transmission of the data packet that was substituted for an original data packet timestamp.

30. (Currently amended) The article of claim 29, wherein the transmit timestamp of the data packet received from the transmitter comprises an updated timestamp, the updated timestamp indicating a time when the data packet was transmitted.

31. (Original) The article of claim 29, wherein identification criterion comprises at least one of a protocol type, a MAC address, a data type, a source address, and a destination address.

32. (Previously presented) The article of claim 29, wherein the media device comprises a digital device capable of processing digital media content.

33. (Previously presented) The article of claim 29, wherein the media device comprises at least one of a personal computer, a workstation, a laptop, and a personal digital assistant.

34. (Currently amended) The article of claim 29, wherein the instructions for searching the received data packet to determine if the received data packet matches a pre-determined identification criterion and to locate a timestamp field within the received data packet further comprises instructions for the packet filter comparing a match string with corresponding bits in the received data packet based on a mask string, wherein the match string represents a string of bytes that match the predetermined identification criterion and the mask string indicates the bits in the match string that are to be compared with the corresponding bits of the received data packet.

35. (Original) The article of claim 29, wherein if the received data packet is a mismatch to the pre-determined identification criterion, further comprising instructions for forwarding the received data packet to the media device without further processing.

36. (Original) The article of claim 29, wherein the pre-determined identification criterion comprises a pre-determined protocol type for a Real-Time Protocol.

37. (Currently amended) The article of claim 29, wherein the instructions for determining an error signal for adjusting a frequency of a local clock using the local timestamp and [[a]] the transmit timestamp extracted from the received data packet further comprise instructions for:

processing the local timestamp and the transmit timestamp extracted from the received data packet;

determining an error signal between the processed local timestamp and the processed transmit timestamp extracted from the received data packet; and

using the error signal as a feedback signal to adjust the frequency of the local clock in the receiver to synchronize the local clock with a clock in the transmitter.

38. (Currently amended) The article of claim 37, wherein the instructions for processing the local timestamp and the transmit timestamp extracted from the received data packet comprises instructions for one or more of low-pass filtering, jitter filtering, and timing correction techniques.

39. (Currently amended) A network adapter for clock recovery comprising:

a transmitter to transmit data packets over a network, the transmitter including a media access controller (MAC) to receive data packets, the MAC connected with a physical layer (PHY) via a digital switch, the transmitter comprising a transmit match filter coupled to a transmit timestamp generator and insertion circuit, the transmit timestamp generator and insertion circuit including a transmit snapshot register and a transmit timestamp counter, the transmit match filter used to determine whether each data packet being transmitted matches a pre-determined protocol and to locate a timestamp field contain an original timestamp within each of the data packets, the timestamp generator and insertion circuit used to generate a transmit timestamp for each data packet when it is determined that the data packet matches the pre-determined protocol and to insert the transmit timestamp for each data packet into the timestamp field for the data packet in real-time as the data packets are being transmitted over the network[[.]];

wherein generating a transmit timestamp for each data packet includes the transmit match filter triggering the snapshot register to take a snapshot of the transmitter timestamp counter; and

wherein inserting the transmit timestamp for each data packet into the timestamp field for the data packet in real-time includes the digital switch switching the PHY from the MAC to the snapshot register and inserting the new transmit timestamp from the snapshot register into the timestamp field of the data packet in place of the original timestamp for the data packet, switching the connection of the PHY back to the MAC to enable a remaining portion of the data packet.

40. (Currently amended) The network adapter of claim 39, further comprising:

a receiver to receive the data packets transmitted over the network, the receiver including a physical layer (PHY) to receive the data packets, the PHY being coupled with a media access controller (MAC), the receiver comprising a receiver match filter coupled to a local timestamp generator circuit, the local timestamp circuit including a receiver snapshot register and a receiver timestamp counter the receiver match filter used to determine whether each received data packet matches the pre-determined protocol and to locate the timestamp field within each of the received data packets, the local timestamp generator circuit used to generate a local timestamp in real-time for each matching data packet when the timestamp field for each such data packet is located[[.]];

wherein generating a local timestamp for each received data packet includes the transmit match filter triggering the snapshot register to take a snapshot of the transmitter timestamp counter.

41. (Original) The network adapter of claim 40, wherein the local timestamp and the transmit timestamp are processed to determine an error signal, wherein the error signal is used to correct a local clock within the local timestamp generator circuit to synchronize the local clock with a transmit program clock within the transmit timestamp generator and insertion circuit.

42. (Currently amended) The network adapter of claim 39, wherein the transmit timestamp generator and insertion circuit comprises a transmit program clock coupled to a transmit timestamp counter; ~~a transmit snapshot register, and a switch, wherein the transmit snapshot register is coupled to the transmit match filter, the transmit timestamp counter and the switch,~~ and wherein an indication from the transmit match

filter that a match has occurred enables the transmit snapshot register to obtain a snapshot of the timestamp counter as the transmit timestamp and enables the switch to connect the transmit snapshot register to an output path to allow the transmit timestamp to be inserted in the timestamp field as the data packets are being transmitted over the network.

43. (Original) The network adapter of claim 42, wherein the snapshot of the transmit timestamp counter is based on a time of the transmit program clock.

44. (Currently amended) The network adapter of claim 40, wherein the receiver timestamp generator comprises a local clock coupled to [[a]] the receiver timestamp counter, and ~~a receiver snapshot register, wherein the receiver snapshot register is coupled to the receiver match filter and the receiver timestamp counter,~~ wherein an indication from the receiver match filter that a match has occurred enables the receiver snapshot register to obtain a snapshot of the receiver timestamp counter as the local timestamp, wherein the snapshot of the receiver timestamp counter is based on a time of the local clock.